Proc. NIPR Symp. Antarct. Geosci., 7, 178, 1994

DETECTION OF REFLECTED WAVES FROM THE LOWER CRUST ON THE MIZUHO PLATEAU FROM RE-ANALYSIS OF JARE-21 SEISMIC REFRACTION DATA (ABSTRACT)

Kiyoshi ITO

Disaster Prevention Research Institute, Kyoto University
Gokanosho, Uji 611

'A reflective lower crust' has been found in some regions in the Japanese islands as well as in the Phanerozoic crusts in Europe and the United States. The reflection from the lower crust in Antarctica has not been surveyed yet and is an important target for explosion experiments in Antarctica. The reflection pattern in the crust is as useful as the velocity structure for study of evolution of the continent.

Seismic refraction data which were obtained during the JARE-21 seismic explosion experiments were re-analyzed to detect reflected waves from the lower crust. This study is aimed at obtaining a preparatory image of reflection of the crust where seismic reflection and refraction studies are planned to be conducted in the near future. The data were obtained by seismic refraction experiments on the Mizuho Plateau, East Antarctica in 1980. An explosion in the sea with 3000 kg of explosive gave well recorded seismic waves at 27 stations along a measuring line of about 300 km from the coast inland. The data were processed using simple procedures of reflection seismology, such as filtering, gain recovery and normal-moveout. A record section band-pass filtered at 10–15 Hz with a reduction velocity of 6 km/s shows clear phases of large amplitudes in a range of 8 to 16 s of two-way travel time ; these are considered to have been reflected from the lower crust. The reflection depths correspond to about 18 to 48 km. The reflected waves are large enough to be detected without gain-recovery, assuming the existence of reflectors in the crust of Mizuho Plateau. However, the spacing of observation stations was too sparse to provide a clear image of reflection in the lower crust.

(Received March 1, 1994; Revised manuscript received March 15, 1994)